DOCUMENT RESUME

ED 226 727 IR 010 608

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TITLE Synopsis of the University of Delaware's Office of Computer-Based Instruction.
PUB DATE 21 Jul 80
NOTE 10p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Computer Oriented Programs; *Demonstration Programs; Educational Objectives; Higher Education; Models; *Program Administration; *Program Descriptions
IDENTIFIERS PLATO; *University of Delaware

ABSTRACT

This brief paper presents background information and a description of the organizational structure and educational objectives of the Office of Computer-Based Instruction, formerly the Delaware PLATO project, whose name was changed to reflect the University's ongoing commitment to providing leadership in educational computing following the completion of the initial project phase. The first section describes the implementation of the PLATO system at the University of Delaware, the materials available, the grants and contracts which have involved use of the system, research applications by faculty, and possible future directions. The organizational structure summarized and depicted in chart form proved to be a highly effective way of managing a computer-based educational project and will continue as the model for project management in the current office. Finally, the nine overall objectives of the office, which reflect the philosophy and purpose of the office and provide a context for the objectives of each project undertaken, are listed. The effects which these objectives have on the educational goals of the university as a whole are discussed where applicable. A table lists faculty project leaders. (LMM)

Synopsis of the University of Delaware's Office of Computer-Based Instruction

Fred T. Hofstetter
July 21, 1980

It is the policy of the University of Delaware that no person shall be subjected to discrimination on the grounds of race, color, religion, sex, national or ethnic origin, age, and handicapped or veteran status.

Introduction

It is the purpose of this paper to provide a synopsis of the University of Delaware's Office of Computer-Based Instruction. The synopsis is organized into three main parts, namely, background information, organizational structure, and educational objectives.

Background

In the fall of 1974 the University's Computer Applications to Education Committee was charged to evaluate existing computer-based educational systems and to recommend a system for demonstration at the University. After several on-site examinations of systems operating throughout the country and consultation with authorities in the field, the committee recommended PLATO© for the demonstration, and the UdPlato Project began. Student and faculty reactions to PLATO were most enthusiastic. The University responded to a steady increase in the number of requests from faculty members to use PLATO in their courses by gradually increasing the number of available terminals. By the Spring of 1980 faculty members, students, and programmers were spending over 200,000 hours annually using the University's 132 PLATO terminals.

PLATO has libraries of programs in over 80 subject areas, and the University's library includes 2,000 hours of lesson materials developed at other institutions. In addition to using these lessons where appropriate, Delaware faculty members are developing their own PLATO lessons for use on the Delaware PLATO system and for publication and use on other PLATO systems. Approximately half of the materials used on the Delaware system are taken from pre-existing program libraries, and the other half are original materials developed by University of Delaware faculty members. To support the development of these lessons, a staff of programmers works with faculty from thirty departments to draw up and program lesson materials. The Delaware PLATO Project has a national reputation for producing high-quality programs.

The University has received five grants from the National Science Foundation to support increased program development in the departments of Anthropology, Biology, Chemical Engineering, Political Science, and Psychology. The Control Data Corporation has funded the development of a national careers package by the Center for Counseling. NSF and the Delaware School Auxiliary Association have also funded a series of Summer Institutes in Computer-Based Education for teachers and gifted high school students. The Department of Education has awarded grants for placing terminals in the New Castle County School District under the Emergency School Aid Act, and in the Urban Coalition Community Centers in

Wilmington under its program for remediation. The University has won large PLATO service contracts with the Federal Aviation Administration and with the du Pont Company, and several institutions have started projects with single terminals connected to the University's PLATO system. These activities have been both a service to the community and a source of revenue whereby the University has been able to increase the size of its PLATO system and the pace of its program development.

Although the PLATO system is primarily intended for the delivery of instruction, several faculty members have also discovered its potential for research. Using automatic data-saving routines faculty members can study student response data to evaluate the teaching effectiveness of computer-based learning materials and to isolate problem areas in particular courses. Computer-based research projects are being carried out in art, biology, chemical engineering, counseling, educational studies, English, human resources, languages, mathematics, music, physical education, political science, and psychology. These projects are being coordinated by a research staff which organizes workshops on computer-based research techniques, clarifies procedures for running statistical programs, sponsors roundtable discussions, offers assistance in grant writing, and maintains an up-to-date research library.

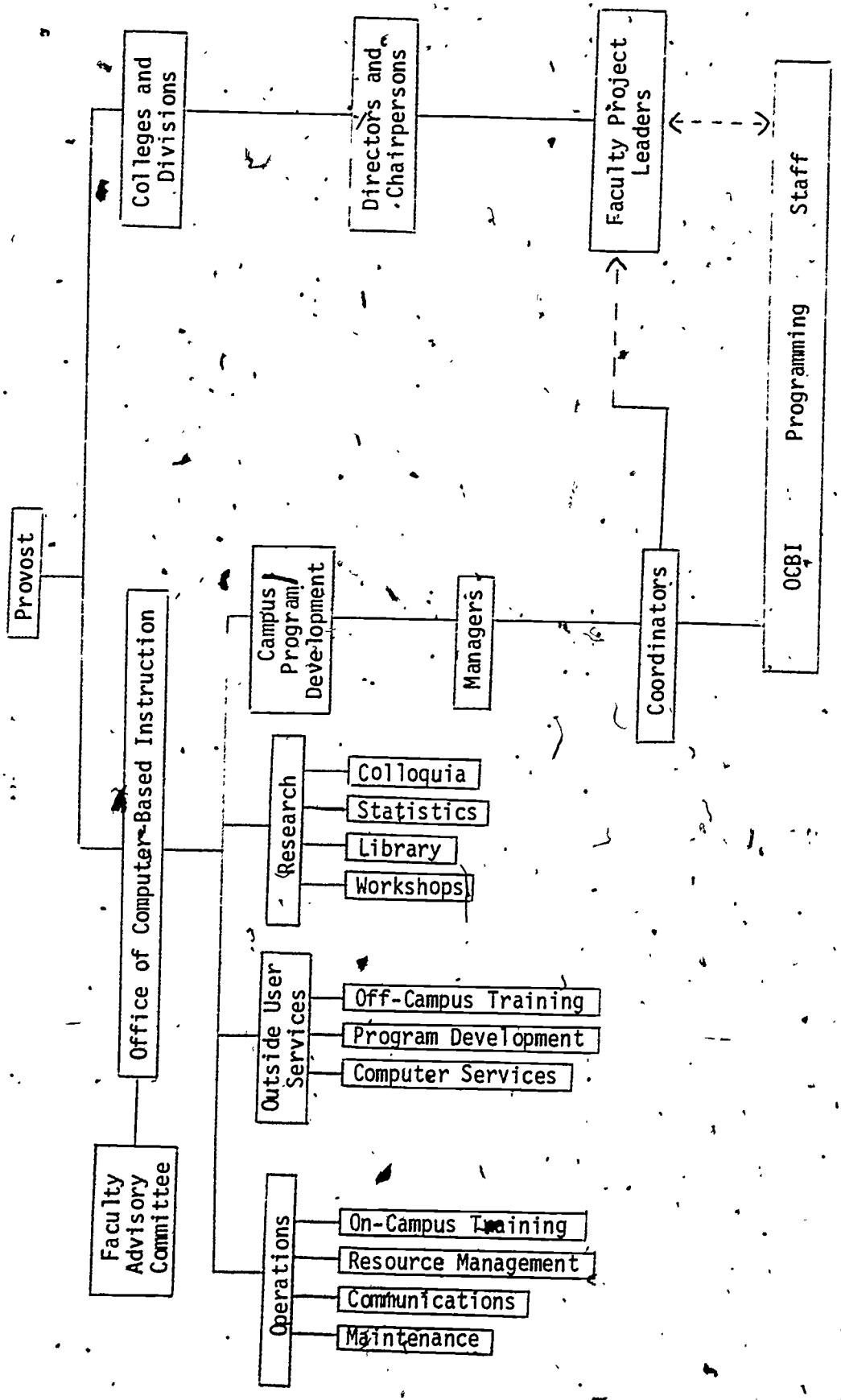
At the close of the fifth year of its demonstration project, the University has developed a highly trained staff which produces high-quality computer-based learning materials, a large PLATO system which provides services to 132 terminals on campus and to 70 terminals off-campus, and a research group which coordinates the faculty's computer-based educational research projects. With the writing of the Fifth Summative Report of the Delaware PLATO Project on July 1, 1980, the demonstration project was completed, and the name of the project was changed to the Office of Computer-Based Instruction in order to reflect the University's on-going commitment to providing leadership in educational computing. The Office will not necessarily deal exclusively with PLATO. When the demonstration was organized in 1974 it was not known what system would be used. PLATO was found to be the best available system, and the demonstration phase was called the UdPlato Project. PLATO is still the best available system, and it will provide a high quality of educational computing on the campus for many more years. As other systems are developed the Office of Computer-Based Instruction may choose to demonstrate them as well and to implement them where appropriate.

Organization

As the UdPlato Project expanded an organizational structure evolved which proved to be a highly effective way of managing a computer-based educational project, and which will continue as the model for project management in the Office of Computer-Based Instruction. Figure 1 shows an overall organizational chart. The director of the Office reports to the Provost and receives recommendations from a faculty advisory committee regarding proposed new projects. All proposals for on-campus projects are received by the director who upon consultation with the

Figure 1

Organizational Chart



faculty advisory committee and the senior staff of the Office forwards them with an appropriate recommendation for funding to the Provost.

The Office consists of four main components, namely, Operations, Outside User Services, Research, and Program Development. Operations encompasses all of the technical details needed to insure that computer equipment works well and that the quality of educational computing service offered through the Office is high. Maintenance, operator training, communications, resource management, and data storage and transfer are all part of Operations. Outside User Services include both hardware and software components. Under hardware the Office makes available to off-campus users the same resources offered on-campus, charging outside users the full cost of their share of the resources. Under software outside users can subscribe to the program libraries used on campus, and they can also contract with the Office's outside program development component to have their own courses designed and/or programmed. A comprehensive training program is also coordinated for on-campus users by Operations and for off-campus users by Outside User Services.

The two remaining parts of the Office are where the primary interface is made to other departments on campus. Research is coordinated by a group of research staff which offers workshops on research techniques, faculty rountables for sharing ideas, a research library, statistical consulting, assistance in grant writing, a speaker series, and colloquia on research in computer-based learning. Program Development accounts for over fifty percent of the use of the computer in the Office at the present time. Organized according to the departments which request services from the Office, for each project there is a faculty project leader who as the principal spokesperson for the department has the final say as to the content of the programs. Table 1 contains a list of the faculty project leaders. The project leader works with other faculty in the department in considering new ways in which computers might assist instructional efforts. The project leader also works closely with Office programmers and coordinators who implement the program and who in turn report to project managers in the Office. Periodic reviews of the design and of the programming by senior staff in the Office are required in order to insure that the final product will be worthy of publication.

Objectives

Listed here are the overall objectives of the Office of Computer-Based Instruction. They reflect the philosophy and purpose of the Office, and they also provide a context for the sub-objectives of each project undertaken by the Office. Where appropriate the effects which these objectives have on the educational goals of the University as a whole are discussed.

1. Educational Leadership: To continue the demonstration of computer-based education at the University of Delaware, developing new applications for existing equipment where appropriate, and introducing to the campus new educational computing devices as they become available. Discussion: We are living in an age of evolving

Table 1

Faculty Project Leaders at the University of Delaware

Projects	Project Leaders
Accounting	Angelo DiAntonio
Agriculture	Paul Sammelwitz
Anthropology	Juan Villamarin
Art	Raymond Nichols
Biology	David Sheppard
Chemical Engineering	Robert Pigford/Stanley Sandler
Chemistry	John Burmeister
Civil Engineering	Eugene Chesson
Computer Science	Hatim Khalil
Continuing Education	Jon Heggan
Counseling	Richard Sharf
Economics	Charles Link
Education/Instruction	Robert Uffelman
Education/Research	Victor Matruza/Richard Venezky
Honors Program	Donald Harward
Health Education	Paul Ferguson
Human Resources	Frances Mayhew
Institutional Research	Carol Pemberton
Languages	Gerald Culley
Mathematics	Ronald Wenger
Military Science	Thomas Reinhardt
Music/Aural Skills	Fred Hofstetter
Music/Written Theory	Michael Arenson
Nursing	Mary Anne Early
Physical Education	David Barlow/James Kent
Political Science	Richard Sylves
Psychology/Instruction	John McLaughlin/James Hoffman
Psychology/Research	James Hoffman
Security	Stephen Swain
Sociology	Vivian Klaff
Student Center	Marilyn Conway
UD English Language Institute	Patricia Dyer
Upward Bound	William Morris
Writing Center	Louis Arena

computer technology. The University of Delaware has pioneered in the application of computers in its educational programs, and as a result its faculty is becoming increasingly aware of how it can best deliver education in the future. The influence which the University is having in this field is evidenced by faculty publications, offices held, grants received, consortia started, and by the numbers of persons visiting our campus to learn about computer-based education.

2. Program Development: To continue the development of high-quality computer-based learning materials for use in University courses, considering both the place which each program has in existing curricula and desired changes in the delivery of curricula which the use of computer-based techniques may facilitate. Discussion: The faculty have found that designing materials for computer-based delivery involves both a careful examination of what is currently done in a course and consideration of ways in which computer-based techniques can improve a course. A systematic review and redesign of University teaching is thereby underway in those departments which are exploring computer-based education.

3. Campus Outreach: To expand the University's geographical reach by means of a computer-based delivery system which can economically deliver interactive instruction over a wide geographical area. Discussion: At the same time as the University faculty is preparing courses for computer-based delivery, technological advances are making it more feasible to deliver these courses in remote learning centers and in homes. For those courses which lend themselves to computer-based delivery, the University will be able to deliver education in many more locations than it can now. One of the objectives in the University of Delaware's Five-Year Plan for Lifelong Learning is to develop experimental programs that use computer-based techniques to deliver instruction in community centers and homes.

4. Service: To share its expertise in computer-based education with persons outside the University by making available at a reasonable cost an educational computing service which includes learning stations, program libraries, training, and program development, and by publishing manuals and reports dealing with the procedures and techniques used in developing computer-based learning materials at the University of Delaware. Discussion: Directly related to the mission of the University is service to the community. Through the UdPlato Project the University has shared its expertise in computer-based learning with other universities and colleges, the public schools, the Urban Coalition, the government, and with industry. By continuing to provide these services the University will be of service in an area which will have a high societal impact in the future.

5. Research: To systematically explore and publish reports on the impact of computers on student achievment, learning styles and

attitudes, and to similarly explore and publish reports on the effects of alternate computer-based methods of organizing, representing and presenting information to students. Discussion: In addition to discovering its potential for improving instructional delivery, the faculty has also found that the computer is a powerful tool for conducting educational research. By way of the Office's research group, the faculty will be using on-line data saving techniques not only to validate the effectiveness of their programs but also to measure the effects of educational variables such as order of presentation, type of feedback, and revised mastery levels, thereby providing new knowledge about the interaction of these variables in education. The effect of different ways of structuring information upon student learning patterns will also be studied.

6. Student Benefits: The following group of objectives deals with advantages to students in a computer-based learning environment. Since they greatly improve the quality of education for students, these objectives are directly tied to the teaching mission of the University:

   a) To individualize instruction. Faculty members and students often complain that the level of instruction is never right for all members in a class. Some are fast learners; others are slow learners. Some drop out because a course is too boring; others drop out because they can't keep up. The individualized, self-paced approach of computer-based learning has proven to be a remedy for this problem of individual differences.

   b) To reduce the time needed for instruction. Computer-based self-paced techniques make it possible for students to finish courses in less than the normal fourteen-week semester. Students will eventually be able to complete degrees ahead of schedule, thereby reducing the cost of instruction to the parent and to the taxpayer.

   c) To emphasize the intrinsic joy of learning and deemphasize competition with peers as a motivating force. In the computer-based environment the anxieties associated with the traditional classroom are minimized. Students are free to respond as they wish without the fear of ridicule from either their peers or their teacher. In such an environment learning is a lot of fun, and motivation is high.

   d) To enable students to develop a richer intuitive grasp of complex phenomena through graphic visual representation. Especially applicable to PLATO is the saying that "A picture is worth a thousand words." The ability of computer graphics to create interactively a display suited to the student's specific learning needs cannot be overestimated.

   e) To provide students with access to a wide range of data for checking out hypotheses. A good example of this benefit is the population dynamics PLATO program. Stored in the computer are

up-to-date data on the populations of countries throughout the world. The student is able to set variables which affect the futures of those populations, such as time and extent of famines, and can then see the effects of those variables upon future generations of the populations.

f) To enable the students to learn more of the complexities of phenomena through modeling and simulation. In addition to giving students drill-and-practice and tutorials on various subjects, computers can also allow the student to create models and simulate complex phenomena. For example, the student can make electronic circuits, design clothes, compose music, draw pictures, mix chemicals, breed fruit flies, and then study the results of the models and simulations.

g) To encourage students to tailor their learning experiences to meet their own objectives. How often do students complain that they did not get what they wanted out of a course? They may have met the instructor's objectives, but they did not meet their own objectives. Computers can help them do both. For example, in the University's advanced music theory courses, very little time is spent on set theory. However, some students want to explore it in depth. It is a complex analytical system which cannot be learned by the average student by reading a book. Interactive instruction in this area is made available to the students who want it by means of PLATO's set theory program. There are ten hours of instruction available for students who want to learn set theory, including periodic tests which assure the student that he is mastering the materials. In this way, students are encouraged to extend their learning beyond the requirements of the course.

h) To give immediate feedback. One of the greatest advantages of computer-based techniques is immediate feedback. Through individual interaction with the computer, the students partake in a dialogue in which they receive instantaneous responses to their input. There is no other medium which provides this interaction, a benefit which has led to the documentation of significant improvement of instruction in such diverse areas as anesthesiology, French, music, mechanics, dentistry, sociology, calculus, geography, ecology, health, physics, and accounting.

i) To provide students an anonymous way of asking questions about sensitive matters. Recent research has shown that the use of anonymous sign-ons whereby students can use the computer without revealing their identities has encouraged students to ask questions and get responses on sensitive issues which they would normally be afraid to discuss. Group notefile capabilities enable students not only to ask questions and to get responses on their own personal questions, but also to see the questions and responses anonymously written by other students. Especially in the area of sex education this has proven to be an excellent means of allowing students to anonymously explore sensitive personal issues.